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CLAIMS:

1. A thermal sensor circuit for sensing the temperature of an integrated circuit chip, the thermal sensor circuit including:
 - 5 an output comparator for comparing a reference voltage, V_{ref} , with a sensed voltage, V_{sense} , the sensed voltage being measured from a sensing device;
 - a first circuit to which a reference voltage line is connected to measure V_{ref} ;
 - a first current mirror providing a first current input to the first circuit and to a compensation circuit;
 - 10 a second current mirror providing a second current input to the compensation circuit and to the sensing device; and wherein
 - the compensation circuit provides a current gain, defined as the ratio of the second current input to the first current input, for compensating for variations in V_{ref} due to variations of the characteristics of the thermal sensing circuit arising from manufacture by adjusting the
 - 15 second current input in dependence on the variations of the characteristics to thereby vary V_{sense} with V_{ref} .
2. The thermal sensor circuit of claim 1, wherein the compensation circuit includes first, second, third and fourth bipolar junction transistors (BJTs) and wherein:
 - 20 the first BJT has a collector terminal connected to the first current input of the first current mirror, a base terminal connected to a common base connection and an emitter terminal connected to ground;
 - the second BJT has a collector terminal connected to the second current input of the second current mirror, a base terminal connected to the common base connection and an
 - 25 emitter terminal connected to ground;
 - the third BJT has a collector terminal connected to the second current input, a base terminal connected the first current input and an emitter connected to the common base connection;
 - the fourth BJT has a collector terminal connected to a voltage supply of the thermal
 - 30 sensor circuit, a base terminal connected to the common base connection and an emitter terminal connected to ground; and

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the ratio of emitter area of the fourth BJT to the emitter areas of the first, second and third BJTs is $N : 1$, where $N > 0$.

3. The thermal sensor circuit of claim 2, wherein the first circuit includes fifth and sixth BJTs, and wherein:

the fifth BJT has a collector terminal connected to the first current input, a base terminal connected to the reference voltage line and an emitter terminal connected to an output point of the first circuit via a first resistor;

the sixth BJT has a collector terminal connected to the first current input, a base terminal connected to the reference voltage line and an emitter connected to the output point of the first circuit; and

the output point of the first circuit is connected to ground via a second resistor.

4. The thermal sensor circuit of claim 3, wherein the ratio of emitter area of the fifth BJT to the emitter area of the sixth BJT is $M : 1$, where $M > 1$.

- Sub A1> 5. The thermal sensor circuit of claim 3 or claim 4, wherein each of the first to sixth BJTs is an n-p-n transistor.

- 20 6. The thermal sensor circuit of claim 3 or claim 4, wherein the current gain is given by:

$$\frac{I_2}{I_1} = \frac{\beta^2 + (3+N)\beta}{\beta^2 + \beta + (2+N)}$$

where:

I_1 is the first current input;

I_2 is the second current input; and

β is the common-emitter current gain of each of the first to sixth BJTs.

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7. The thermal sensor circuit of claim 2, wherein the first and second current mirrors are connected to the voltage supply of the thermal sensor circuit and use p-n-p BJTs to supply the first and second current inputs, respectively.

Add A2>